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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/808,684	03/25/2004	Jeffrey Peter Allen	05046-00042	6186

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EXAMINER

CANTELMO, GREGG

ART UNIT	PAPER NUMBER
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1745

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	02/01/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary

Application No.

10/808,684

Applicant(s)

ALLEN, JEFFREY PETER

Examiner

Gregg Cantelmo

Art Unit

1745

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-21 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-21 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 24 March 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. ____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date <u>SEE OFFICE ACTION</u> . | 6) <input type="checkbox"/> Other: ____. |

DETAILED ACTION

Priority

1. Applicants claim to Provisional Application Serial No. 60/462,645, filed on April 14, 2003 is acknowledged.

Information Disclosure Statement

2. The information disclosure statements filed March 25, 2004 and August 17, 2005 have been placed in the application file and the information referred to therein has been considered as to the merits.

Drawings

3. The drawings received March 25, 2004 are acceptable for examination purposes.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1, 6 and 19 are rejected under 35 U.S.C. 102(b) as being anticipated by WO 00/59060 A (WO '060) discloses an electrolyte delivery apparatus comprising an electrolyte reservoir 46 comprising electrolyte therein; a fluid conduit 41 in fluid communication with the electrolyte reservoir 46, the conduit configured to receive electrolyte from the reservoir and a pressure generator operative to force electrolyte out of the reservoir and into the fluid conduit (see page 5, ll. 5-12 and page 9, line 32 to page 9, line 8). The heating device is the fuel cell stack itself and is in thermal

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communication with the electrolyte reservoir (see page 3, para. 3). The electrolyte fluid conduit can also serve as the process gas conduit which is also in thermal connection with the stack. The fuel cell inherently heats the electrolyte fluid to the temperature of the fuel cell stack and thus increases the fluidity of the electrolyte (Fig. 4 as applied to claims 1, 6 and 19).

6. Claims 1-3, 6-10, 13, 15, 17 and 19-21 are rejected under 35 U.S.C. 102(b) as being anticipated by JP 08-153529 A (JP '529).

JP '529 discloses an electrolyte delivery device, a fuel cell assembly comprising the electrolyte delivery device and a method of supplying electrolyte to the fuel cell comprising: an electrolyte reservoir 26 and/or 27, a fluid conduit in communication with the reservoir to provide electrolyte to the device requiring the electrolyte, a heating device 29 and a pressure generator defined by valve 25 which uses gas from line 18a to force electrolyte from the reservoir (Fig. 2 as applied to claims 1, 3, 6-7, 13 and 19). The heater 29 is a coiled resistive heater (Fig. 2 as applied to claim 2). The fuel cell is a molten-carbonate fuel cell (MCFC, abstract as applied to claim 8). Each of the anode and cathode include nickel in the catalyst material (paragraph [0024] as applied to claim 9). The heater 29 is a resistive heater and positioned about the reservoir and a portion of the fluid conduit (Fig. 2 as applied to claim 10). Opening of the Bulbs 25 and 28 provide a condition which indicates operative flow of the pressurized gas from inlet line 18a through to the electrolyte reservoir 26. This in conjunction with positive electrolyte flow from the reservoirs 26/27 into the fuel cell constitutes a means for showing or detecting the flow of the pressurized gas (Fig. 2 as applied to claim 15). Bulb 25 is

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controlled inherently by either automated means or by a human user and upon opening of the bulb 25 to permit flow of gas along the line attached to the bulb will represent a positive activation of the pressure generator to the reservoirs 26 and 27 (Fig. 2 as applied to claim 17). The electrolyte is delivered to a molten carbonate fuel cell (Fig. 2 as applied to claims 20 and 21).

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

9. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over JP '529.

The teachings of JP '529 have been discussed above and are incorporated herein.

JP '529 is silent as to the particular material of the various lines and conduits.

The use of stainless steel lines would have been readily apparent to one of ordinary skill in the art since it would have provided a material which is corrosion

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resistant to the electrolyte and also has good thermal conductivity, the latter would have been significant in the region proximate to the resistive heater 29 to ensure complete melting of the electrolyte prior to introducing it into the fuel cell. The selection of a known material based on its suitability for its intended use supported a prima facie obviousness determination in *Sinclair & Carroll Co. v. Interchemical Corp.*, 325 U.S. 327, 65 USPQ 297 (1945) See also *In re Leshin*, 227 F.2d 197, 125 USPQ 416 (CCPA 1960). MPEP § 2144.07.

10. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over JP '529 in view of U.S. Patent No. 4,572,876 (Spurrier).

The teachings of JP '529 have been discussed above and are incorporated herein.

Venting a closed container such as the electrolyte reservoir permits purging of the pressure gas and prevents pressure buildup in the reservoir as shown by Spurrier (Fig. 6 and prior art claim 7).

Therefore it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the teachings of JP '529 by adding a vent to the electrolyte reservoir since it would have provided a design for balancing pressure in the electrolyte feeding system.

11. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over JP '529 in view of U.S. Patent No. 6,322,916 (Hemmes).

The teachings of JP '529 have been discussed above and are incorporated herein.

JP '529 does not teach of a fuel cell stack however such a modification would have been readily apparent to one of ordinary skill in the art.

The number of fuel cells within the stack determines the total voltage of the stack, and the surface area of each of the cells determines the total current. The total electrical power generated by a given fuel cell stack can be determined by multiplying the total stack voltage by total current. Additionally Hemmes teaches of MCFC stacks and that fuel cell stacks are generally known in the art. In said fuel cell stack the cathode and the anode of successive fuel cells are separated by means of a separator plate made, for instance, from stainless steel. By means of such a fuel cell stack a greater capacity can be achieved, respectively connecting the individual fuel cells in series will result in a higher voltage (col. 2, ll. 45-52).

Therefore it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the teachings of JP '529 by incorporating the fuel cell disclosed therein into a fuel cell stack since it would have provided a power source have a greater electrical power to meet the demand of higher load electrical devices.

12. Claims 12 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP '529 in view of U.S. Patent No. 4,572,876 (Spurrier).

The teachings of JP '529 have been discussed above and are incorporated herein.

JP '529 does not teach of providing a second conduit (claim 12) or replenishment tube (claim 16) to replenish electrolyte in the electrolyte reservoir.

Spurrier discloses an electrolyte replenishing system which includes an electrolyte reservoir having an electrolyte-replenishing conduit 108 which permits feeding of additional electrolyte into the electrolyte replenishing system.

Therefore it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the teachings of JP '529 by further providing an electrolyte replenishing conduit to the electrolyte reservoir since it would have enabled a means for introducing additional electrolyte to the reservoir as needed and thus provided a prolonged ability to replenish electrolyte to the fuel cell system and improved both the efficiency and power output of the fuel cell.

13. Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over JP '529 in view of U.S. Patent No. 5,426,002 (Matsumura).

The teachings of JP '529 have been discussed above and are incorporated herein.

JP '529 does not teach of using a thermocouple in thermal communication with the electrolyte reservoir.

However it is apparent that JP '529 monitors or requires a minimum temperature to the electrolyte so as to ensure that the electrolyte is in a molten state. Use of temperature sensors, including thermocouples, is conventionally known as a means for providing temperature feedback of a device or environment (see Matsumura, col. 3, ll. 13-30).

Therefore it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the teachings of JP '529 to provide a

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thermocouple in thermal communication with the electrolyte reservoir of JP '529 since it would have provided a means for effectively monitoring the temperature of the electrolyte to ensure that the electrolyte temperature was sufficient so as to place it in a molten state.

14. Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over JP '529 in view of JP 64-030170 A (JP '170).

The teachings of JP '529 have been discussed above and are incorporated herein.

JP '529 does not teach of providing a timer to deactivate the pressure generator after a certain period of time.

However either a controller (automated or human) operates the bulbs 25 and 28 and thus opens and closes the bulbs as needed. Thus the controller which controls these bulbs themselves could serve as timers, selecting a desired operating time as needed for running and then terminating the electrolyte replenishment portion of the fuel cell system. In addition, JP '170 discloses monitoring the power output of the fuel cell and upon a decrease in the output below a threshold level, a signal is sent to replenish electrolyte to the fuel cell. It would further be understood that once the power outputs are increased to the requisite level that electrolyte replenishment would no longer be required and thus terminated.

Therefore it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the teachings of JP '529 by providing a controller to control the time at which the electrolyte replenishment is activated as well

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as a control response time at which the replenishment is terminated to improve the efficiency of the electrolyte replenishment system and fuel cell system.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Gregg Cantelmo whose telephone number is 571-272-1283. The examiner can normally be reached on Monday to Thursday, 8:00-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Pat Ryan can be reached on 571-272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



gc
January 30, 2007

Gregg Cantelmo
Primary Examiner
Art Unit 1745